



**THE EFFICACY OF PHOSPHOTUNGSTIC ACID
AND FERROUS SULPHATE TOWARDS
Alternanthera dentata AND *Lawsonia inermis* IN
CYTOLOGICAL STAINING FOR BUCCAL CELL
SCREENING**

By

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DECLARATION

I hereby declare that this thesis is my original work and was carried out in accordance with the regulations of Universiti Teknologi MARA and has not been submitted previously or currently for any other degree at UiTM or any other institutions.

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ABSTRACT

Alternanthera dentata and *Lawsonia inermis* leaves has been selected to substitute hematoxylin and Eosin Azure 50 in Papanicolaou stain which is a synthetic dye that has been widely used as a cytological stain. The purpose of the study is to evaluate the suitability of the mordants which are 2% of phosphotungstic acid and 3% of ferrous sulphate in enhancing the staining ability of *Alternanthera dentata* and *Lawsonia inermis* on nucleus and cytoplasm of buccal cell. From the study, it has been prove that ferrous sulphate can enhance the color uptake by the natural dye and having the ability to enhance the color uptake by the natural dyes by staining nucleus and the cytoplasm with its own color whereas phosphotungstic acid reduces the ability of the natural dyes to stain. Furthermore, the intermediate cells of the buccal smear are degenerated with an addition of 2% phosphotungstic acid which may due to the mordant's high acidity level. A qualitative study has been done by selecting 10 volunteers to evaluate the staining color of the natural dyes with a comparison to Papanicolaou stain as a quality control. Whereas, a quantitative study were done by using MIPAR software, One-way ANOVA and Weighted Kappa Test. The statistical analysis shows that ferrous sulphate can enhance the color uptake but the color, specificity in determining superficial and intermediate cell and the color intensity are not comparable with the gold standard Papanicolaou stain. Thus, ferrous sulphate is the most suitable mordant that can increase the staining efficacy of the *Alternanthera dentata* and *Lawsonia inermis* on buccal cells.

Keywords: Natural dyes, *Alternanthera dentata*, *Lawsonia inermis*, and mordants.